

UNIVERSITY of
HOUSTON

Department of Campus Safety
Environmental Health and Life Safety

FALL PROTECTION PROGRAM MANUAL



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PURPOSE

Purpose is to protect University of Houston (UH) employees and contractors from fall hazards while performing work at the University.

SCOPE

This program manual applies to all UH employees and contractors that are involved in General Industry functions as in found 29 Code of Federal Regulations (CFR) 1910.23, 25, 26, 27, 66, 67, 68, 132, and 140. An overview of these regulations can found at <https://www.osha.gov/SLTC/fallprotection/>.

Contractors involved in new construction are regulated under the construction fall protection standard in 29 CFR 1926.502. They must have a site health and safety plan that includes fall protection procedures. This plan is part of the submittal process and must be followed.

POLICY

All UH employees exposed to a fall 4 feet or greater in height, or those with a potential to fall into or onto dangerous equipment regardless of height, must be protected. Contractors on campus are required to have a written fall protection program per General Industry Regulations. If the UH Program is more stringent it must be followed.

DUTIES AND RESPONSIBILITIES

Environmental Health & Life Safety (EHLS)

Provide technical information and assist departments in implementing this program.

Provide recommendations for fall protection during the building design process.

Provide and/or coordinate fall protection instruction as needed.

Review and revise the Fall Protection Program Manual, as needed, for compliance with applicable regulations.

Facility Services

Supervisors

Ensure that UH employees are informed, trained, and provided with the appropriate fall protection systems and equipment to be protected from potential fall hazards associated with job tasks.

Coordinate the correction of fall hazards brought to their attention by employees.

Employees

Comply with the Fall Protection Program Manual and any further safety recommendation provided by the supervisor and/or EHLS regarding fall protection.

Complete fall protection training as directed and request further instruction if unclear.

Conduct assigned tasks in a safe manner and wear all assigned personal protection equipment.

Report any unsafe or unhealthy work conditions and job related injuries or illnesses to the supervisor and or EHLS immediately.

AREAS or ACTIVITIES THAT REQUIRE FALL PROTECTION

Each employee on a walking or working surface 4 feet or more above a lower level shall be protected from falls. Below are areas and activities which may be fall hazards. A glossary of fall protection terms is found in Appendix A.

AERIAL LIFT DEVICES

Employees utilizing aerial lifts shall be protected from fall hazards including a barrier system and fall arrest system.

PORTABLE LADDERS

The proper ladder must be selected for the task. When a straight ladder is used to gain access to a roof, the side rails should extend at least three feet above the support point at the eave, gutter, or roof line. Ladders must be placed on level surfaces. Where possible, straight ladders should be secured with a rope or wire at the top and blocked at the bottom.

Always face the ladder and use both hands while ascending and descending. Carrying heavy loads up or down ladders is prohibited. Ladders should not be used by more than one person at a time unless they are designed for such use. The bracing on the back side rails of stepladders is designed only for increasing stability, not for climbing. Straight ladders and stepladders that exceed 10 feet may be held by another person for steadying.

INSPECTION OF LADDERS

Prior to use of any ladder, a visual inspection must be performed. The ladder should be equipped with feet that are secured in place. Inspect for dents or bends in side rails, rungs or cleats. An example ladder inspection checklist is included in Appendix B.

MAINTENANCE OF LADDERS

Damaged ladders must be withdrawn from service and either repaired or destroyed. Defective or unsafe conditions must be reported to the supervisor.

FIXED INDUSTRIAL STAIRS

The following applies to all stairs around equipment, machinery, tanks etc. They do not apply to stairs used for fire exits. Riser height and tread width of fixed industrial stairs should be uniform throughout any flight of stairs. Every flight of stairs having four or more risers shall be equipped with standard handrails. All treads must be reasonably slip resistant. All stairs should be adequately lighted.

SCAFFOLDS

Fall protection is required for all scaffold use 4 feet or more above a lower level. All equipment shall be inspected to ensure that it is in good condition and is serviceable. Damaged or deteriorated equipment shall not be used. A scaffold shall not be moved while personnel are on it. Follow all manufacturer's

guidelines and special warnings if the scaffold is commercially produced. The minimum working platform width is two feet. Working platforms should have a nonslip surface. Scaffolds should be used only on an even surface. Work platforms shall be secured in position. Hard hats must be worn within an area beneath elevated work where objects could fall from a height and strike a worker.

ROOFING

Employees performing roofing activities on steep roofs (having a slope greater than 4 in 12, vertical to horizontal) must be protected from falling by the use of guardrail systems with toe boards, personal fall arrest systems, or safety net systems. Employers can use guardrail systems around roof openings and at the roof perimeter to protect workers from fall hazards. The top rails of a guardrail system must be 39 to 45 inches above the walking/working surface. Guardrail systems must be able to withstand a 200-pound force in any outward or downward direction within 2 inches of the top edge. Currently UH employees are not working on UH buildings with a steep roof.

PERSONAL FALL PROTECTION SYSTEMS

One form of fall protection is a personal fall arrest system (PFAS). When used properly, these systems will arrest a fall and prevent the worker from contacting a lower level. A PFAS consists of an anchor, a harness, and a lifeline or lanyard (usually with a deceleration device).

There are many regulatory requirements regarding the strength of PFAS components, including connectors, lanyards and lifelines, harnesses and anchorages. (OSHA CFR 29 1910.66). Straps have to be made of synthetic fiber. The anchorage must support 5,000 pounds per employee attached. Anchorages cannot be connected to platforms, guardrails or hoists. If a PFA system is used for fall protection, it must do the following. Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness. Bring a worker to a complete stop and limit maximum deceleration distance an employee travels to 3 ½ feet. PFA systems must be inspected before each use for wear, damage and other deterioration. Defective components must be removed from service. D-rings and snap hooks must have a minimum tensile strength of 5,000 pounds. Snap hooks must be sized to be compatible with the component to which they will be of locking. Lifelines must be protected against being cut or abraded. Ropes and straps (webbing) used in lanyards, lifelines and strength components of body belts and body harnesses must be made of synthetic fibers. Anchorages used to attach the PFAS must be independent of any anchorage being used to support or suspend platforms. Employers must ensure that fall arrest equipment, subjected to the forces of a fall, are taken out of service until it has been inspected and determined to be undamaged and suitable for reuse.

INSPECTION OF EQUIPMENT

The PFAS must be inspected before each use for wear, damage and other deterioration. Defective components must be removed from service. PFAS equipment that has been subjected to “impact loading”—subjected to forces like those during a fall—must be immediately removed from service and not be used again until inspected by a competent person and determined to be undamaged and suitable for reuse. This applies to the harness, lanyard, lifeline, anchorage and their component parts. At a minimum, the harness and lanyard will need to be discarded as a result of impact loading. A demonstration of wearing a body harness is found in Appendix C.

TRAINING

Training shall be provided to all employees performing work on an elevated work surface or who may be exposed to a fall hazard. The training program should enable employees to recognize fall hazards and provide the recommended steps to be followed to minimize these hazards. Employees shall be trained in the following areas by a competent person. The nature of fall hazards in the work area. Procedures for erecting, maintaining, disassembling and inspecting fall protection systems being utilized. The use and operation of guardrail systems, fall restraint systems, personal fall arrest systems, safety monitoring systems, and other protection to be used. The employee's role in the fall protection program. The applicable standards and regulations regarding the work to be performed. Limitations of fall protection equipment.

APPENDIX A

Glossary of Terms

Aerial lift device: means equipment such as powered platforms, vehicle-mounted elevated and rotating work platforms, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers and powered industrial truck platforms.

Anchor point: A secure point of attachment for lifelines, lanyards or deceleration (grabbing) devices.

Authorized Person: A person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or job site, i.e., building maintenance, roof repair, etc.

Body belt: A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration (grabbing) device. **Body belts are prohibited at the University of Houston.**

Body harness (also referred as Full-body harness): An interconnected set of straps that may be secured about a person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

Connector: A device that is used to connect parts of a personal fall arrest system together (i.e. D-rings, and snaphooks).

Competent person: A person who is capable of recognizing existing and predictable hazards and has the authority to take corrective action. Additionally, a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof as well as in their application and use with related equipment. To be considered a competent person, an 8-hour training class must be completed for general fall protection and an additional 4-hour training class must be completed for scaffolds. To be considered a competent person for equipment inspections, the manufacturer's training guidelines shall be followed.

Controlled access zone -- A work area designed and clearly marked in which certain types of work, such as overhand bricklaying, may take place without the use of conventional fall protection systems (e.g. guardrail, personal arrest or safety net) to protect the employees working in the zone.

Deceleration device: Any mechanism, such as a rope, grabbing device, ripstitch lanyard, specially woven lanyard or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deceleration distance: The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

Designated area: a space which has a perimeter barrier erected to warn employees when they approach an unprotected side or edge, and serves also to designate an area where work may be performed without additional fall protection.

Free Fall: The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free Fall Distance: The vertical displacement of the fall arrest attachment point on the employee's body harness between the onset of the fall, and just before the system begins to apply force to arrest the fall. Free fall distance must not exceed 6 feet. **This distance excludes deceleration distance and lifeline/lanyard elongation distance.**

Guardrail: A barrier erected to prevent personnel from falling to lower levels. This system includes a mid-rail and toe board able to withstand 200 pounds applied to the top rail in any direction.

Hole: A void or gap 2 inches or more in its least dimension in a floor, roof, or other walking/working surface.

Horizontal lifeline: a flexible line between two horizontal fixed anchorages to which a fall arrest device is connected.

Infeasible: means that it is impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection. **Ladder:** a device typically used to gain access to a different elevation consisting of two or more structural members crossed by rungs, steps, or cleats.

Lanyard: A flexible line of rope or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline or anchor point.

Leading Edge: The edge of a floor, roof, or other walking/working surface, which changes location as additional floor, roof, etc., is placed or constructed. A leading edge is considered an unprotected side or edge when not under active construction.

Lifeline: A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Lower levels: Those areas or surfaces to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits tanks, material, water, equipment, structures, or portions thereof.

Low-slope roof: means a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Mechanical equipment: means all motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.

Opening: A gap or void 30 inches or more high and 18 inches or more wide in a wall or partition, through which personnel can fall to a lower level.

Positioning device system: means a body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Personal fall arrest system: means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Qualified Climber: a person who by virtue of physical capabilities, training, work experience and job assignment who is authorized by the employer to routinely climb fixed ladders and step bolts on structures such as towers and poles that do not have ladder protection devices such as cages and rest platforms.

Qualified person: one with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project or product.

Restraint line: a device which is attached between the employee and an anchorage to prevent the employee from walking or falling off an elevated surface.

Roof: means the exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily becomes the top surface of a building.

Roof work: means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Rope grab (grabbing device): A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

Safety-monitoring system -- A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards

Scaffold: means any temporary elevated or suspended platform, at its supporting structures, used for supporting employees or materials or both.

Self-retracting lifeline/lanyard: A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal movement and which, after onset of a fall, automatically locks the drum and arrests the fall(usually within two feet or less).

Standard railing: A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

Steep roof: means a roof having a slope greater than 4 in 12 (vertical to horizontal).

Snaphook: A connector consisting of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released automatically closes to retain the object. **Only locking snap hooks are permitted at the University of Houston.**

Toe board: A low protective barrier that prevents material and equipment from falling to lower levels and which protects personnel from falling.

Tie-Off: A procedure of connecting directly or indirectly to an anchorage point.

Total Fall Distance: The maximum vertical change in distance from the bottom of an individual's feet at the onset of a fall, to the position of the feet after the fall is arrested - including free fall distance and deceleration distance.

Unprotected sides and edges: means any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

Vertical Lifeline: A component consisting of a flexible line for connection to an anchor point at one end to hang vertically and that serves as a means for connecting other components of a personal fall arrest system to the anchor point.

Walking/working surface: means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, form work and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

Warning line system: A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which work can be conducted without the use of guardrails, personal fall arrest systems, or safety nets to protect employees in the area. This will be utilized on any roof greater than 50" wide and in conjunction with a safety monitor only where the other forms of fall protection have been deemed infeasible to use.

Work area: means that portion of a walking/working surface where job duties are being performed.

Appendix B

Ladder Safety Checklists



Stepladder

Size _____ ft.

Fiberglass

Aluminum

Wood



Circle Areas of Damage

		Yes	No
Steps:	Loose, Cracked, Bent or Missing	<input type="checkbox"/>	<input type="checkbox"/>
Rails:	Cracked, Bent, Split or Frayed	<input type="checkbox"/>	<input type="checkbox"/>
	Rail Shields	<input type="checkbox"/>	<input type="checkbox"/>
Labels:	Missing or Not Readable	<input type="checkbox"/>	<input type="checkbox"/>
Pail Shelf:	Loose, Bent, Missing or Broken	<input type="checkbox"/>	<input type="checkbox"/>
Top:	Cracked, Loose or Missing	<input type="checkbox"/>	<input type="checkbox"/>
Spreader:	Loose, Bent or Broken	<input type="checkbox"/>	<input type="checkbox"/>
General:	Rust, Corrosion or Loose	<input type="checkbox"/>	<input type="checkbox"/>
Other:	Bracing, Shoes, Rivets	<input type="checkbox"/>	<input type="checkbox"/>

Actions: Ladder tagged as damaged & removed from use
 Ladder is in good condition



Extension Ladder

Size _____ ft.

Fiberglass

Aluminum



Circle Areas of Damage

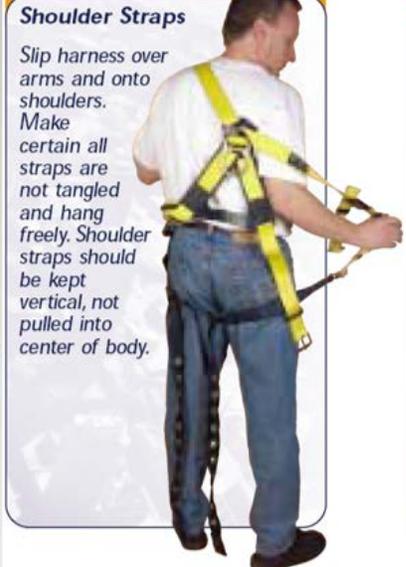
		Yes	No
Rungs:	Loose, Cracked, Bent or Missing	<input type="checkbox"/>	<input type="checkbox"/>
Rails:	Cracked, Bent, Split or Frayed	<input type="checkbox"/>	<input type="checkbox"/>
Labels:	Missing or Not Readable	<input type="checkbox"/>	<input type="checkbox"/>
Rung Locks:	Loose, Bent, Missing or Broken	<input type="checkbox"/>	<input type="checkbox"/>
Hardware:	Missing, Loose or Broken	<input type="checkbox"/>	<input type="checkbox"/>
Shoes:	Worn, Broken or Missing	<input type="checkbox"/>	<input type="checkbox"/>
Rope/Pulley:	Loose, Bent or Broken	<input type="checkbox"/>	<input type="checkbox"/>
Other:	Bracing Rivets	<input type="checkbox"/>	<input type="checkbox"/>
General:	Rust, Corrosion or Loose	<input type="checkbox"/>	<input type="checkbox"/>

Actions: Ladder tagged as damaged & removed from use
 Ladder is in good condition

Appendix C

Putting On a Body Harness

Donning a Harness

Step 1	Step 2	Step 3
<p>Getting Started</p> <p>Hold harness by back D-ring which is held in place by a D-ring pad, make certain straps are not twisted.</p> 	<p>Shoulder Straps</p> <p>Slip harness over arms and onto shoulders. Make certain all straps are not tangled and hang freely. Shoulder straps should be kept vertical, not pulled into center of body.</p> 	<p>Leg Straps</p> <p>Grab dark blue leg straps and connect to buckles attached to yellow straps on each hip (see photos below for your specific buckle type). Pass excess strap through loop keepers. Leg straps should fit snugly.</p> 

Donning a Harness

Step 4

Chest Strap

Attach chest strap by passing male buckle through female buckle (see buckle type photo below for further details). Strap should be six inches below top of shoulders. Pass excess strap through loop keeper.



Step 5

Adjust harness to fit snugly.

Shoulders:

To tighten, pull up on free ends of straps as shown, to loosen, push down on parachute adjuster buckle frame. Straps should be adjusted to same length.

Chest Strap:

To tighten, pull free end of strap, to loosen, push on strap from free end through adjuster buckle and take up slack by pulling on adjuster buckle. To position, slide keeper up or down shoulder strap.

Leg Straps:

See photos at left for your type of leg adjuster buckle.

Back D-ring:

Center between shoulder blades, slide D-ring and pad up or down along the webbing to position.



A properly donned and adjusted full body harness will effectively distribute impact forces throughout your body and provide appropriate support during suspension and rescue following a fall.